



## Electrical engineering has a bright future

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If you have a knack for mathematics, science and communication, consider plugging into a career in electrical engineering.

Students who earn a degree in this field can explore careers with electric motors, lighting and wiring systems, automobiles, aircraft, power generation, medical technology or radar and navigation systems.



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Bob Grohovsky's career as an electrical engineer has taken him from his native Terre Haute to Nashville, Tenn., where he works as a communications manager with Microsoft. - Photo: Tanzy Wallace

### RELATED INFORMATION

**Electrical engineering**

**Take in high school:** AP calculus, AP chemistry, AP computer science, AP physics.

**Typical college courses:** Circuit analysis and design, digital systems, dynamics, electric components and tools, electrodynamics, semiconductor technology, statics, technical writing for engineers.

**Related majors:** Aerospace engineering, applied physics, computer engineering, computer software engineering, electrical engineering technology, mechanical engineering, physics, robotics.

**Degree:** A bachelor's degree in engineering is required for most entry-level jobs.

**Possible careers:** Aerospace engineer, computer hardware engineer, electrical engineer, electronics technician, engineering technician, mechanical engineer.

### **Salary**

The average starting salary is among the highest of all college graduates.

**Low end:** Environmental, \$47,960

**High end:** Petroleum, \$60,718

Median annual salary for all specialties, experience and levels of education: \$81,660

**Low end:** Agricultural, \$66,030

**High end:** Petroleum, \$98,380

### **What's hot out there**

Two areas of electrical engineering are picking up steam: the alternative energy and biomedical fields. A stronger focus on the environment and the advancement of noninvasive medical procedures are providing engineers more opportunities to specialize in these areas.

### **Energy**

The focus is on developing cost-effective energy sources such as solar and wind power. The smart grid was designed to deliver electricity from suppliers to users through digital technology. It's popular because it saves energy and reduces costs. Students interested in this discipline should take core math and science classes, plus electives to learn about topics such as wind turbines, rotating energy conversion, wind generation and power-system control and security.

### **Medical**

Electrical engineering factors heavily in the development of biomedical technology. Medical imaging and telemedicine are being studied as ways to keep people out of the doctor's office. After completing core classes, students learn about instrumentation – both analog and digital. They also may study techniques whereby wireless sensors are attached to a person's body so doctors can monitor status through an IP address, gauging vital signs from virtually anywhere when the patient is scanned.

Sources: [CollegeBoard.com](http://CollegeBoard.com),  
U.S. Bureau of Labor Statistics

“Electrical engineering is a very broad field because everything basically uses electricity at some level,” said Dr. Fred Berry, head of the department of electrical and computer engineering at Rose-Hulman Institute of Technology. “Anything that has to use electricity, whether it’s consuming it or generating it, the electrical engineer will be involved in that.”

Electrical engineering draws heavily from the principles of math and science, so interested students should take these courses before reaching the college level.

“If given a choice, always choose the math, physics and chemistry classes before you take the technology classes, because those are the underlying skills that allow you the fundamentals so you can move forward,” Berry said.

Written communication skills also are important because engineers must document their work. Writing and grammar courses are recommended.

Bob Grohovsky, an Indiana State University graduate who now is a communications manager with Microsoft in Nashville, Tenn., believes the broadness of the engineering field furthered his career.

“The curriculum prepared me for a lot of things through the troubleshooting,” he said. “It allowed me the ability to go back and get my MBA in marketing, which diversified [my career]. Engineering opens up opportunities that a lot of disciplines do not.”

Students interested in electronics can supplement their core skills by exploring technology courses offered in high school. If none are available, Project Lead the Way might be able to help.

Project Lead the Way ([www.pltw.org](http://www.pltw.org)) is a national nonprofit organization that offers pre-engineering and engineering technology programs in middle and high schools in all 50 states. Its four-year program of specially designed courses prepares students to further their education in engineering technology.

“[Project Lead the Way is] one of the few programs in the nation today that allow students to explore technology, whether it’s design, electronic, robotics or a civil architectural component,” said Art Haase, dean of the technology division at Vincennes University.

Berry and Haase agree that engineering students who are multidimensional and adept at problem solving will be in demand when entering the work force.